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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,522	01/27/2006	Yoshito Jin	96790P520	5835

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EXAMINER

VALENTINE, JAMI M

ART UNIT	PAPER NUMBER
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2894

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/566,522	Applicant(s) JIN ET AL.	
	Examiner JAMI M. VALENTINE	Art Unit 2894	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 23-32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/27/06, 8/20/07</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION***Election/Restrictions***

1. **Claims 1-32** are pending in this application. Applicant's election **without** traverse of Group IA (Claims 1-22) in the reply filed on 10/30/08 is acknowledged. **Claims 23-32** are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim. The requirement is deemed proper and is therefore made FINAL. **Claims 1-22** are examined in this Office action.

US National Phase of PCT

2. Acknowledgment is made that this application is the US national phase of international application PCT/JP05/13413 filed 21 July 2005 which designated the U.S. and claims benefit of the following:

Country:	Priority #:	Filing Date:
JP	2005-111756	04/08/2005
JP	2005-097714	03/30/2005
JP	2005-091097	03/28/2005
JP	2005-070723	03/14/2005
JP	2005-068853	03/11/2005
JP	2005-068839	03/11/2005
JP	2005-052655	02/28/2005
JP	2005-010202	01/18/2005
JP	2005-006254	01/13/2005
JP	2004-361199	12/14/2004
JP	2004-361152	12/14/2004
JP	2004-357429	12/09/2004
JP	2004--319088	11/02/2004
JP	2004-214849	07/22/2004
JP	2004-214863	07/22/2004
JP	2004-214858	07/22/2004
JP	2004-214851	07/22/2004

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Foreign Priority

3. Acknowledgment is made that the certified copy of the foreign priority documents have been received.

Information Disclosure Statement

4. Acknowledgment is made that the information disclosure statement has been received and considered by the examiner. If the applicant is aware of any prior art or any other co-pending applications not already of record, he/she is reminded of his/her duty under 37 CFR 1.56 to disclose the same.

Drawings

5. There are no objections or rejections to the drawings.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. **Claim 3** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Per **Claim 3**, the following language is indefinite “a gate electrode formed from said first electrode; a source electrode formed from said second electrode; and a drain electrode formed from said third electrode”. It is unclear whether the gate electrode is a separate element that is attached to the first electrode or if the gate electrode is the same as the first electrode. Similarly, it is unclear whether the source electrode is a separate element that is attached to the second

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electrode or if the source electrode is the same as the second electrode. Similarly, it is unclear whether the drain electrode is a separate element that is attached to the third electrode or if the drain electrode is the same as the third electrode. For the purposes of examination the limitation is interpreted as follows: “a gate electrode is said first electrode; a source electrode is said second electrode; and a drain electrode is said third electrode”

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. **Claims 1-6, 9-11, 20 and 22** are rejected under 35 U.S.C. 102(b) as being anticipated by Koyama et al. (Japanese Patent Publication No 08-306806) hereinafter referred to as Koyama.

Per **Claim 1** Koyama (e.g. figure 1 and [0028]) discloses a device, comprising

- a first metal oxide layer (14) containing at least two metals (e.g. BiTiO₁₂ [0014]) on a substrate and has a thickness
- a first electrode (13) which is formed on one surface of said first metal oxide layer;
- a second electrode (e.g. (16), right) which is formed on the other surface of said first metal oxide layer.
- The recitation “predetermined” does not distinguish the claimed device over that of the applied prior art since any thickness is a predetermined thickness.

11. The recitation “bistable resistance value acquisition” has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any

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patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951). Notwithstanding, the recitation is anticipated by the applied reference in [0034] discloses two resistance states.

12. Per **Claim 2**, Koyama discloses the device of claim 1 including a third electrode (16, left) which is formed on said other surface of said first metal oxide layer (14) while being spaced apart from said second electrode (16, right).

13. Per **Claim 3**, Koyama discloses the device of claim 1 including a gate electrode is said first electrode (13) ; a source electrode is said second electrode (16, right); and a drain electrode (16, left) is said third electrode

14. Per **Claim 4**, Koyama discloses the device of claim 1 including a second metal oxide layer (15) which is made of the metal oxide of the first metal oxide layer (14) on the substrate, and has a predetermined thickness and a fourth electrode (16, left) which is provided on said second metal oxide layer (15), wherein said first electrode (13) , said first metal oxide layer (14), said second metal oxide layer (15), and said fourth electrode (16,left) are connected in series in an order named (see figure 1 and [0030-31]).

15. Per **Claims 5 and 6**, Koyama discloses the device of claims 1 and 4, respectively including an insulating layer (17) which is in contact with at least one of said one surface and said other surface of said first metal oxide layer (as in figure 1)

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16. **Claims 9-11** each recite the performance properties of the device, i.e. the behavior of the metal oxide under supplied electrical signals and voltage. These functional limitations do not distinguish the claimed device over the prior art, since it appears that these limitations can be performed by the prior art structure of Koyama [0010]. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. In re *Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429,1431-32 (Fed. Cir. 1997) See MPEP 2114.

17. Per **Claim 20**, Koyama discloses the device of claim 1 including where the substrate is made of a conductive material. [0013]

18. Per **Claim 22**, Koyama discloses the device of claim 1 including where the metal oxide is a ferroelectric. [0030]

Claim Rejections - 35 USC § 103

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

20. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

21. **Claims 7-8 and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over Koyama.

22. Per **Claim 7**, Koyama disclose the device of claim 1 including an amorphous layer ((12), also see [0029]) in an amorphous state formed on the substrate (11); an element that includes said first electrode (13) made of a conductive material [0013] in a crystalline state and formed on said amorphous layer (12), said first metal oxide layer (14) formed on said first electrode (13), and said second electrode (16, right) formed on said first metal oxide layer (14); and an isolation layer (17) formed on said amorphous layer (12) between said elements, wherein said plurality of elements are isolated by said isolation layer

23. Koyama does not teach (A) a plurality of such devices; (B) where the first electrode is in a crystalline state; (C) where the isolation layer is made of the metal oxide.

24. It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a plurality of such devices, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 103 USPQ 8.

25. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed materials for the first electrode and the isolation layer, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for its intended use as a matter of design choice. *In re Leshin*, 125 USPQ 416.

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26. **Claim 8** recites the method of manufacturing of the first metal oxide layer and said isolation layer. These limitations are "product-by-process" limitations. While product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. In *re Hirao*, 190 USPQ 15 at 17(footnote 3). The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. In *re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) See also in *re Brown*, 173 USPQ 685; In *re Luck*, 177 USPQ 523; In *re Fessmann*, 180 USPQ 324; In *re Avery*, 186 USPQ 116 in *re Wertheim*, 191 USPQ 90 (209 USPQ 254 does not deal with this issue); and In *re Marosi et al*, 218 USPQ 289 final product per se which must be determined in a "product by, all of" claim, and not the patentability of the process, and that an old or obvious product, whether claimed in "product by process" claims or not. Note that Applicant has the burden of proof in such cases, as the above case law makes clear.

27. Per **Claim 21**, Koyama discloses the device of claim 20, but fails to teach where the first electrode is identical to the substrate.

28. It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the material for the electrode that is identical to the substrate , since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for its intended use as a matter of design choice. In *re Leshin*, 125 USPQ 416.

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29. **Claims 12-19** are rejected under 35 U.S.C. 103(a) as being unpatentable over Koyama in view of Kijima et al. (US Patent No 5,811,181) hereinafter referred to as Kijima.

30. Per **Claim 12**, Koyama disclose the device of claim 1 but fails to teach where the metal oxide comprises at least a base layer made of at least a first metal and oxygen, and a plurality of fine particles made of the first metal, a second metal, and oxygen and dispersed in said base layer

31. Kijima (e.g. figure 8A) teaches a ferroelectric material including a metal oxide that comprises at least a base layer made of at least a first metal and oxygen, and a plurality of fine particles made of the first metal, a second metal, and oxygen and dispersed in said base layer. Specifically, Kijima (column 11, lines 36-45) teaches “a structure in which fine crystal grains of $\text{Bi}_4\text{Ti}_3\text{O}_{12}$ are diffused into an amorphous titanium oxide medium.”

32. All of the component parts are known in Koyama and Kijima. The only difference is the combination of the old elements into a single device, by using the metal oxide materials of Kijima in the device of Koyama. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the metal oxide materials of Kijima in the device of Koyama in order to achieve the predictable result of providing well known metal oxide materials for a ferroelectric device. Additionally, it would have been obvious to a person of ordinary skill in the art to try metal oxide materials of Kijima in an attempt to provide an improved ferroelectric device, as a person with ordinary skill has good reason to pursue the known options within his or her technical grasp. *KSR International Co. v. Teleflex Inc.*, 550 U.S.--, 82 USPQ2d 1385 (2007).

33. Per **Claim 13**, Koyama in view of Kijima disclose the device of claim 12, including where said base layer is made of the first metal, the second metal, and oxygen in which a content

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of the second metal is smaller in comparison with a stoichiometric composition. Specifically, the bismuth content is reduced from that of $\text{Bi}_4\text{Ti}_3\text{O}_1$. Kijima (column 11, lines 36-45)

34. Per **Claim 14**, Koyama in view of Kijima disclose the device of claim 12, including where the base layer contains the first metal, the second metal, and crystals of oxygen Kijima (column 11, lines 36-45), but fails to teach where the crystals of oxygen are column crystals.

35. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use column crystals of oxygen, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for its intended use as a matter of design choice. *In re Leshin*, 125 USPQ 416.

36. Per **Claim 15**, Koyama in view of Kijima disclose the device of claim 12, including where the metal oxide comprises a metal oxide monolayer in an amorphous state, in contact with said base layer and made of at least the first metal and oxygen. Kijima teaches a titanium oxide buffer layer (column 9, lines 22-25).

37. Per **Claim 16**, Koyama in view of Kijima disclose the device of claim 15, including where said metal oxide monolayer, a content of the second metal is smaller in comparison with a stoichiometric composition of the first metal, the second metal, and oxygen. Specifically, the bismuth content is reduced from that of $\text{Bi}_4\text{Ti}_3\text{O}_1$. Kijima (column 11, lines 36-45)

38. Per **Claim 17**, Koyama in view of Kijima disclose the device of claim 15, including where said metal oxide monolayer does not contain the fine particles. Kijima teaches a titanium oxide buffer layer (column 9, lines 22-25).

39. Per **Claim 18**, Koyama in view of Kijima disclose the device of claim 12, including where the first metal is titanium, the second metal is bismuth, and said base layer is in

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amorphous state and is formed from a layer containing titanium in an excessive amount relative to a stoichiometric composition. Specifically, the bismuth content is reduced from that of $\text{Bi}_4\text{Ti}_3\text{O}_{11}$. Kijima (column 11, lines 36-45)

40. Per **Claim 19**, Koyama in view of Kijima disclose the device of claim 18, including where the first electrode is made of platinum and has a single-layer structure made of a single material (column 9 lines 11-12).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMI M. VALENTINE whose telephone number is (571)272-9786. The examiner can normally be reached on Monday-Friday 9am-6pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly Nguyen can be reached on (571) 272-2402. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jami M. Valentine/

/Kimberly D Nguyen/

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Examiner
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Supervisory Patent Examiner, Art Unit
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/JMV/